

Author's Accepted Manuscript

Pre- and post-treatments free nanocomposite based hole transport layer for high performance organic solar cells with considerably enhanced reproducibility

Jiaqi Cheng, Xingang Ren, Hugh L. Zhu, Jian Mao, Chunjun Liang, Jiaqing Zhuang, Vellaisamy A.L. Roy, Wallace C.H. Choy



PII: S2211-2855(17)30089-7
DOI: <http://dx.doi.org/10.1016/j.nanoen.2017.02.021>
Reference: NANOEN1797

To appear in: *Nano Energy*

Received date: 15 November 2016
Revised date: 8 February 2017
Accepted date: 13 February 2017

Cite this article as: Jiaqi Cheng, Xingang Ren, Hugh L. Zhu, Jian Mao, Chunjun Liang, Jiaqing Zhuang, Vellaisamy A.L. Roy and Wallace C.H. Choy, Pre- and post-treatments free nanocomposite based hole transport layer for high performance organic solar cells with considerably enhanced reproducibility *Nano Energy*, <http://dx.doi.org/10.1016/j.nanoen.2017.02.021>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

Pre- and post-treatments free nanocomposite based hole transport layer for high performance organic solar cells with considerably enhanced reproducibility

Jiaqi Cheng^a, Xingang Ren^a, Hugh L. Zhu^a, Jian Mao^a, Chunjun Liang^a, Jiaqing Zhuang^b, Vellaisamy A. L. Roy^b, Wallace C. H. Choy^{a*}

^aDepartment of Electrical and Electronic rEngineering, The University of Hong Kong, Pokfulam Road, Hong Kong, SAR China.

^bDepartment of Physics and Materials Science and Centre for Functional Photonics (CFP), City University of Hong Kong, Kowloon, Hong Kong, SAR China

E-mail: chchoy@eee.hku.hk (Choy)

Abstract

In this work, we demonstrate a one-step room-temperature ethanol-processed nickel oxide (NiO_x):electron acceptor nanocomposite functioning as efficient hole transport layer (HTL). Specifically, one-step refers to the formation of the nanocomposite HTL films without extra steps of pre-treatments of ITO nor post-treatments of HTL films, and thus considerably reduce the fabrication complexity and cost. By varying the concentration of the electron acceptor, 2,3,5,6-tetrafluoro-7,7,8,8-tetracyanoquinodimethane (F4-TCNQ), the work function (WF) of the nanocomposite films can be widely tuned from 4.73 eV to 5.30 eV, which favors its use for photovoltaic applications of organic donor materials with different highest energy occupied molecular orbital (HOMO) energy levels. Organic solar cells (OSCs) have been fabricated by using the NiO_x:F4-TCNQ nanocomposite as HTL. The optimized average power conversion efficiency (PCE) of

Download English Version:

<https://daneshyari.com/en/article/5451911>

Download Persian Version:

<https://daneshyari.com/article/5451911>

[Daneshyari.com](https://daneshyari.com)